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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KURT M. SCHROEDER, and TIECHENG A. QIAO

Appeal 2008-3111
Application 10/625,637
Patent Application Publication 2005/0019214
Technology Center 1700

Decided: 4 June 2008

Before RICHARD E. SCHAFER, SALLY GARDNER LANE, and MICHAEL P. TIERNEY *Administrative Patent Judges*.

LANE, *Administrative Patent Judge*.

DECISION ON APPEAL

I. STATEMENT OF THE CASE

The appeal is from a Final Rejection of claims 24-39. 35 U.S.C. § 134. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

The application was filed July 23, 2003. It was published on January 27, 2005, as Patent Application Publication 2005/0019214 ("Pub. 2005/0019214"). The real party in interest is said to be Eastman Kodak Company. (App. Br. 1).

The Examiner relied on the following references:

Name	Number	Date
Mihara	4,331,444	May 25, 1982
Rembaum	4,929,400	May 29, 1990
de Jaeger	4,837,168	Jun. 6, 1989

Appellants did not argue against the prior art status of any of these references.

We note that Appellants did not file a Reply Brief.

Appellants appealed the rejection of claims 24-39, all the pending claims, under 35 U.S.C. § 103(a) over the combination of the teachings of Mihara, Rembaum, and de Jaeger. Appellants did not argue separately for the patentability of any of the rejected claims. We review claim 24 as a representative claim. *See* Bd. R. 41.37(c)(1)(vii).

II. FINDINGS OF FACT

The record supports the following findings of fact as well as any other findings of fact set forth in this opinion, by at least a preponderance of the evidence.

1. Claim 24 recites:

> A polymeric particle for use in a microarray comprising a loaded polymeric particle having
> at least one functionally active group that can interact with a biological probe;
> at least one photographic coupler; and
> a high boiling solvent,
> wherein said polymeric particle is loaded with said at least one photographic coupler and said high boiling solvent.

2. According to Appellants' specification, "[t]he particular polymer employed to make the particles or microspheres is any water immiscible synthetic homopolymer or copolymer that may be colored." (Spec. 4).

3. Appellants' specification provides: "The colorable polymeric microspheres of the present invention comprise at least one compound (commonly called coupler) capable of forming color after a suitable chemical development step." (Pub. 2005/0019214 ¶ [0024]).

4. The "high boiling solvents" disclosed in Appellants' specification include alkyl phthalates. (Pub. 2005/0019214 ¶ [0034]).

5. Appellants' specification teaches:

> The photographic couplers and high boiling organic solvents may be imbibed into the polymeric microsphere particle by any of the well known techniques of loading photographically useful compounds into polymer latexes such as; U.S. Pat 4,199,363, 4,247,627, 4,368,258, 5,594,047, and U.K. 2016017. Included in these techniques is the process by which the color forming compound is [1] first dissolved in the high boiling organic solvent, and optionally, either a volatile organic solvent or partially water miscible solvent, and [2] the resulting organic solution is homogenized in the presence of a surface active agent to form a small particle dispersion of the organic composition. This composition is [3] then mixed with the polymeric microspheres to achieve a homogeneous composition of organic compounds in the polymer particle.

(Pub. 2005/0019214 ¶ [0035]).

6. Mihara relates to "marking or labeling an antigen or antibody with a silver halide fogging agent . . ." (Mihara col. 1, l. 68, through col. 2, l. 2), without radiation exposure. (*Id.* col. 1, ll. 57-60).

7. Mihara teaches: "These silver halides can be emulsion dispersed or suspended in a hydrophilic colloid binder solution . . . ." (Mihara col. 7, ll. 26-27).

8. Mihara teaches further that the "[p]hotographic emulsion layers of photographic light sensitive materials which can be used in this invention can contain color image-forming couplers, that is, compounds capable of forming dyes by reaction with the oxidation product of an aromatic amine (normally a primary amine) developing agent (hereafter referred to as a coupler)." (Mihara col. 8, ll. 55-61).

9. Mihara teaches:

> To introduce the aforesaid couplers into a silver halide emulsion layer, conventional methods as described in U.S. Pat. No. 2,322,027 can be employed. For example, these couplers can be [1] dissolved in high boiling point solvents such as an alkyl phthalate(s) (dibutyl phthalate, dioctyl phthalate, etc.), . . . or into an organic solvent(s) having a low boiling point of about 30° to about 150° C., . . .; the solution is then [2] dispersed in the hydrophilic colloid(s).

(Mihara col. 10, ll. 3-20).

10. As Appellants noted in their specification, "U.S. 4,837,168 [de Jaeger] discloses latex particles that contain a color-forming moiety that can be covalently bound to the polymer backbone, or solvated in the latex particle." (Spec. 1; *see also* de Jaeger col. 2, ll. 58-68).

11. The color-forming moieties disclosed in de Jaeger are couplers. (*See* de Jaeger col. 3, l. 47, through col. 5, l. 30).

12. de Jaeger teaches using the latex particles to label specific binding agents, such as antibodies and receptors. (de Jaeger col. 1, ll. 17-21, and col. 2, ll. 50-57).

13. Rembaum relates to "[s]mall polymeric microspheres, especially those containing covalent binding functional groups [for] uses in separation processes such as affinity chromatography, in labelling and sorting of biological cells, in diagnostic testing and in clinical treatment." (Rembaum col. 1, ll. 24-29).

14. Rembaum teaches that "[h]ydrophilic and functional microspheres provide biocompatible substrates having surface sites available for covalent bonding." (Rembaum col. 7, ll. 59-61).

15. Rembaum teaches that "[f]luorescent and nonfluorescent dye may also be incorporated with the mixture to prepare colored particles." (Rembaum col. 7, ll. 29-31).

III. ISSUES

The issue is whether the Appellants have shown that the Examiner erred in rejecting claims 24-39 under 35 U.S.C. § 103(a) over the combination of the teachings of Mihara, de Jaeger, and Rembaum.

IV. LEGAL PRINCIPLES

To determine whether subject matter would have been obvious, "the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved . . . . Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented." *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18 (1966).

The Supreme Court has noted that a combination of references renders claimed subject matter obvious

> [w]hen a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability.

KSR Int'l Co. v. Teleflex Inc., 127 S.Ct. 1727, 1740 (2007).

V. ANALYSIS

Claim 24 recites:

> A polymeric particle for use in a microarray comprising a loaded polymeric particle having
> at least one functionally active group that can interact with a biological probe;
> at least one photographic coupler; and
> a high boiling solvent,
> wherein said polymeric particle is loaded with said at least one photographic coupler and said high boiling solvent.

(FF[1] 1). To "load" a polymeric particle with a "photographic coupler" and a "high boiling solvent," Appellants' specification teaches a process wherein (1) the coupler is dissolved in the high boiling organic solvent, (2) the resulting organic solution is homogenized to form a small particle dispersion, and (3) the composition is mixed with the polymeric microspheres. (FF 5). Appellants' specification teaches that alkyl phthalates are "high boiling solvents." (FF 4).

Mihara teaches preparing a silver halide emulsion dispersed in a hydrophilic colloid binder, which can be used to label antigens or antibodies

[1] Finding of Fact.

without the need for radiation exposure. (FFs 6 and 7). Mihara teaches that these photographic emulsions can include color image-forming couplers. (FF 8). To prepare the photographic emulsions, Mihara teaches (1) dissolving the coupler in a high boiling point solvent, such as an alkyl phthalate, and then (2) dispersing the solution in a hydrophilic colloid. (FF 9).

As Appellants noted in their specification, de Jaeger teaches latex particles with color-forming moieties, such as couplers, solvated into them. (FFs 10 and 11). The latex particles taught in de Jaeger can be used to label specific binding proteins, such as antibodies and receptors. (FF 12). Rembaum teaches microspheres with covalent binding functional groups and dyes for biological testing. (FFs 13-15).

It would have been obvious at the time of Appellants' filing to load a high boiling solvent and a photographic coupler, as in Mihara, into a latex particle, as in de Jaeger, or a microsphere with functionally active groups, as in Rembaum, because the high boiling solvent allows the coupler to be loaded and the coupler allows for detection of trace components without using radioactivity. Furthermore, those in the art would have had a reason to look to these references because each relates to the field of labeling biological molecules. (FFs 6, 12, and 13). We agree with the Examiner that there would be a reasonable expectation of success in combining these teachings because:

> The substrate onto which the dye solution is applied does not appear to be significant to the reason for using the solvent. Therefore, based on the teachings of Mihara et al., it would have been obvious to one of ordinary skill in the art to dissolve the dyes in a high-boiling solvent prior to applying the solution to any substrate, including microspheres. Moreover, because

> the dyes are dissolved in the solvent, it naturally flows that the solvent will be loaded into the microspheres along with the dyes.

(Advisory Action 2).

Appellants argued that none of the cited references discloses microspheres loaded with a coupler and a high boiling solvent. (App. Br. 3-4). But, the combination of the references would have suggested the claimed polymeric particle, thus rendering it obvious. "Nonobviousness can not be shown by attacking references individually where the rejection is based upon a combination of references." *In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986).

Appellants also argued that Mihara specifically fails to teach loading a polymeric particle with a high boiling solvent because a different patent, US 5,585,230, teaches "it is desirable to remove solvent after preparing the dispersions for silver halide emulsions prior to coating." (App. Br. 5). But, U.S. 5,585,230 at col. 7, l. 59, through col. 8, l. 67, teaches dissolving couplers in "low-boiling or partially water-soluble organic auxiliary solvent," not in "high boiling" solvents. Thus, Appellants have not convinced us that it is desirable to remove "high boiling solvents." Indeed, Appellants have not directed us to, nor have we found, any teaching in Mihara to remove "high boiling solvents." Nor have Appellants argued that the teaching of Mihara is inoperable. Accordingly, Appellants have not directed us to sufficient evidence showing that one skilled in the art would not have had a reasonable expectation of success without solvent removal. Appellants have not shown an error in the prima face case for obviousness.

Appellants argued that the claimed invention produced "surprising results." (App. Br. 8). Appellants pointed to the examples, specifically

Table 1 on page 24, which reportedly "indicates that the use of high boiling solvent provides enhanced color formation - as compared to the use of coupler in microspheres alone." (*Id.*). In order to show unexpected results sufficient to rebut prima facie obviousness, a comparison must be made with the closest prior art. *In re Baxter Travenol Labs.*, 952 F.2d 388, 392 (Fed. Cir. 1991) ("when unexpected results are used as evidence of nonobviousness, the results must be shown to be unexpected compared with the closest prior art.").

Mihara teaches the combination of a high boiling solvent and a coupler. Data comparing the use of a coupler alone with the use of the combination of a high boiling point solvent and a coupler does not amount to a "comparison" with the closest prior art since Mihara already teaches the use of the combination.

We find no error in the Examiner's rejection of claim 24 as being unpatentable under 35 U.S.C. § 103(a).

VI. ORDER

Upon consideration of the record and for the reasons given, the Examiner's rejection of claims 24-39 under 35 U.S.C. § 103(a) over the combination of the teachings of Mihara, de Jaeger, and Rembaum is AFFIRMED.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

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